MAYOR & COUNCIL AGENDA COVER SHEET

MEETING DATE:

January 31, 2005

CALL TO PODIUM:

Mark DePoe

RESPONSIBLE STAFF:

Mark DePoe,
Long Range Planning Director

Rob Robinson, Planner

AGENDA ITEM:
(please check one)

	Presentation
	Proclamation/Certificate
	Appointment
	Public Hearing
	Historic District
	Consent Item
	Ordinance
	Resolution
	Policy Discussion
X	Work Session Discussion Item
	Other:

PUBLIC HEARING HISTORY:

(Please complete this section if agenda item is a public hearing)

Introduced	
Advertised	
Hearing Date	
Record Held Open	
Policy Discussion	

TITLE: Work Session

Kentlands Alignment Study of the Corridor Cities Transitway (*CCT Alignment Alternatives*)

SUPPORTING BACKGROUND:

This study is an analysis of the viability of directly serving the Kentlands community by realigning the proposed Corridor Cities Transitway (CCT). The proposed CCT is part of the larger I-270/ US 15 Multi-Modal Corridor Study.

The study analyzed four alternative alignments and two transportation systems management (TSM) options. These alternatives were compared to the Master Plan alignment, which is the route formally under consideration for the CCT. Comparisons of the alternatives were made based upon capital costs, mobility and circulation, ridership, quality of life considerations, and environmental/community impacts. The TSM options include retaining the Master Plan alignment with the addition of a pedestrian and/or shuttle bus bridge to improve connectivity between the CCT station and the Kentlands/Lakelands communities.

To discuss the findings, the City has asked MaryAnne Polkiewicz, Project Manager with the Maryland Transit Administration, and Rick Kiegel, Project Consultant from McCormick Taylor, to give a presentation. This presentation will discuss the analysis findings, both advantages and disadvantages to realignment, and the conclusion that the Kentlands alignment not be recommended. A copy of this presentation will be provided the night of the meeting. Following the presentation, Ms. Polkiewicz and Mr. Kiegel will be available for questions.

Attached:
January 14, 2005 letter from MaryAnne Polkiewicz, MTA Project Manager
Corridor Cities Transitway Kentlands Alignment Study

DESIRED OUTCOME:

Obtain Understanding of Proposed CCT Alignment

MTA Maryland

MARYLAND TRANSIT ADMINISTRATION

MARYLAND DEPARTMENT OF TRANSPORTATION

Robert L. Ehrlich, Jr., Governor • Robert L. Flanagan, Secretary • Lisa L. Dickerson, Acting Administrator

January 14, 2005

Mr. Greg Ossont
Director, Planning and Code Administration
City of Gaithersburg
31 South Summit Street
Gaithersburg MD 20877

Dear Mr. Ossont:

Please find enclosed eight copies of the final Kentlands Alignment Study for your review and use. We appreciate your continued involvement in the I-270/US 15 Multi-Modal Corridor Study and the Corridor Cities Transitway (CCT) in particular. We understand your interest regarding the outcome of this report and hope that the findings answer your questions and allow you to proceed with finalizing decisions within your department.

The study takes a very close look at the community, its successes and the potential impacts of shifting the CCT alignment. It carefully considered the critical factors related to the potential realignment including capital costs, mobility and circulation, and ridership. The evaluation looked at the potential benefits of the realignment as well as its impacts. In addition, the study considered less quantitative factors such as quality of life, environmental and community impacts. Based on the findings, a realignment of the CCT through The Kentlands is not recommended. The Maryland Transit Administration (MTA) is moving forward with plans showing the CCT along the Master Plan alignment.

We will continue to work with the City of Gaithersburg and Montgomery County to promote accessibility to the transitway from the surrounding communities. This may include a pedestrian/shuttle bus bridge and shuttle bus service. We strongly recommend that the City maintain ownership of the parcel in the northeast quadrant of the Great Seneca Highway/Orchard Ridge Drive intersection just south of the MedImmune complex and continue coordination with MTA regarding our needs for stations and parking lots.

Thank you for your continued support of the project. If you have any questions, please do not hesitate to call me at 410-767-3426.

Sincerely,

MaryAnne Polkiewicz
Project Manager

cc: Mr. Simon Taylor, Director, Office of Planning, Maryland Transit Administration

Corridor Cities Transitway

Kentlands Alignment Study

January 2005

MTA Maryland

Office of Planning
6 St. Paul Street
Baltimore, Maryland 21202-1614

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Executive Summary

This study presents an analysis of the feasibility of realigning the proposed Corridor Cities Transitway (CCT) alignment to directly serve the Kentlands community in Gaithersburg. Both Kentlands and the adjacent Lakelands communities have been developed as traditional neighborhood developments (TNDs). TNDs provide an alternative to the conventional, automobile-oriented suburban development pattern. They allow mixing of land uses and are designed to be pedestrian friendly. The potential for the integration of the transit investments and surrounding land use was a primary factor in studying the feasibility of a Kentlands alignment.

In analyzing the feasibility of potential CCT alignments through the Kentlands area, four alternative alignments, and two transportation systems management (TSM) options were identified. These alternatives were compared to the Master Plan alignment, which is the route formally under consideration for the CCT. The TSM options retain the Master Plan alignment and station, but add a pedestrian bridge and shuttle bus bridge, respectively, to improve connections between the station area and the Kentlands and Lakelands communities. In addition, a hypothetical future redevelopment scenario was included in the analysis of ridership and traffic impacts. This scenario was developed during a charrette that was convened in 2003 by the original designers of the Kentlands. The charrette plan included an aggressive redevelopment of the Kentlands Square Shopping Center into a transit oriented town center.

The analysis found that a Kentlands alignment would provide better integration with land use and provides greater potential for generating walk trips to transit than the Master Plan alignment. A Kentlands alignment could also generate local gains in ridership due to a station location that is within an active pedestrian area. The local increase in ridership would be further increased when the aggressive redevelopment scenario that was envisioned in the charrette plan is applied.

However, the analysis also showed that introduction of a transitway through the Kentlands area could result in significant impacts to the local roadway system, which is already expected to degrade over time irrespective of the CCT. Noise and vibration impacts to residential areas could also be of concern under a bus rapid transit operating scenario due to frequent headways. The analysis also found that there would be higher capital costs associated with a Kentlands

alignment due to the increased length required to serve the target area. These factors would adversely affect the cost effectiveness of the CCT project overall, and would negatively impact the chances of the project receiving FTA approval in a very competitive field of New Start proposals. The longer alignment length would also increase travel time to passengers requiring travel through the Kentlands area on the CCT versus the Master Plan alignment and, as a result, would decrease the ridership north of this area

The TSM options, which provide a pedestrian bridge and a shuttle bus bridge associated with the Master Plan alignment and station, would improve safety for those pedestrians wishing to make the walk from the Kentlands and Lakelands areas to the station. While it would not create the kind of integration between transit and surrounding land use that would be achieved by locating the station directly in the Kentlands, it could nevertheless be an improved viable alternative solution.

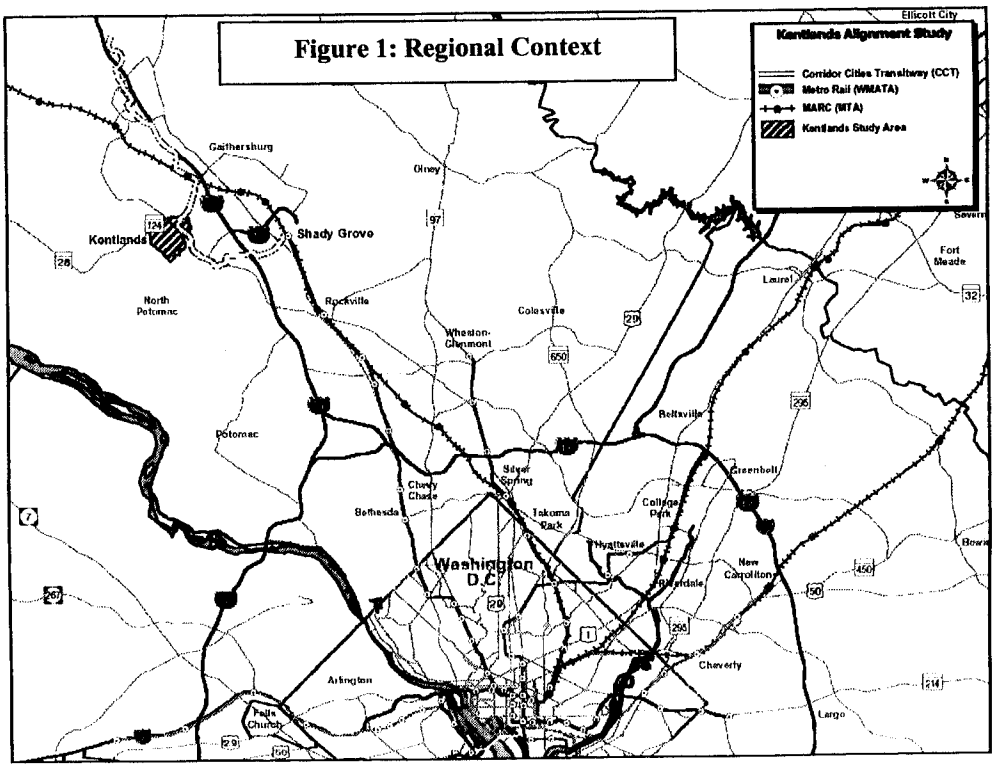
Based on the findings presented in this report, a realignment of the CCT through the Kentlands is not recommended. However, as efforts continue to plan and design the CCT, further study of the TSM options to include better pedestrian connections to communities south of Great Seneca Highway is recommended.

1.0 Introduction

The Corridor Cities Transitway (CCT) is one of the options currently being considered within the larger I-270/US 15 Multi-Modal Corridor Study being undertaken by the Maryland State Highway Administration and the Maryland Transit Administration (MTA). Light rail transit (LRT) and bus rapid transit (BRT) are being considered as potential transit modes. The Kentlands alignment study was initiated to examine the feasibility of rerouting the proposed CCT alignment to serve the Kentlands and Lakelands communities in the City of Gaithersburg.

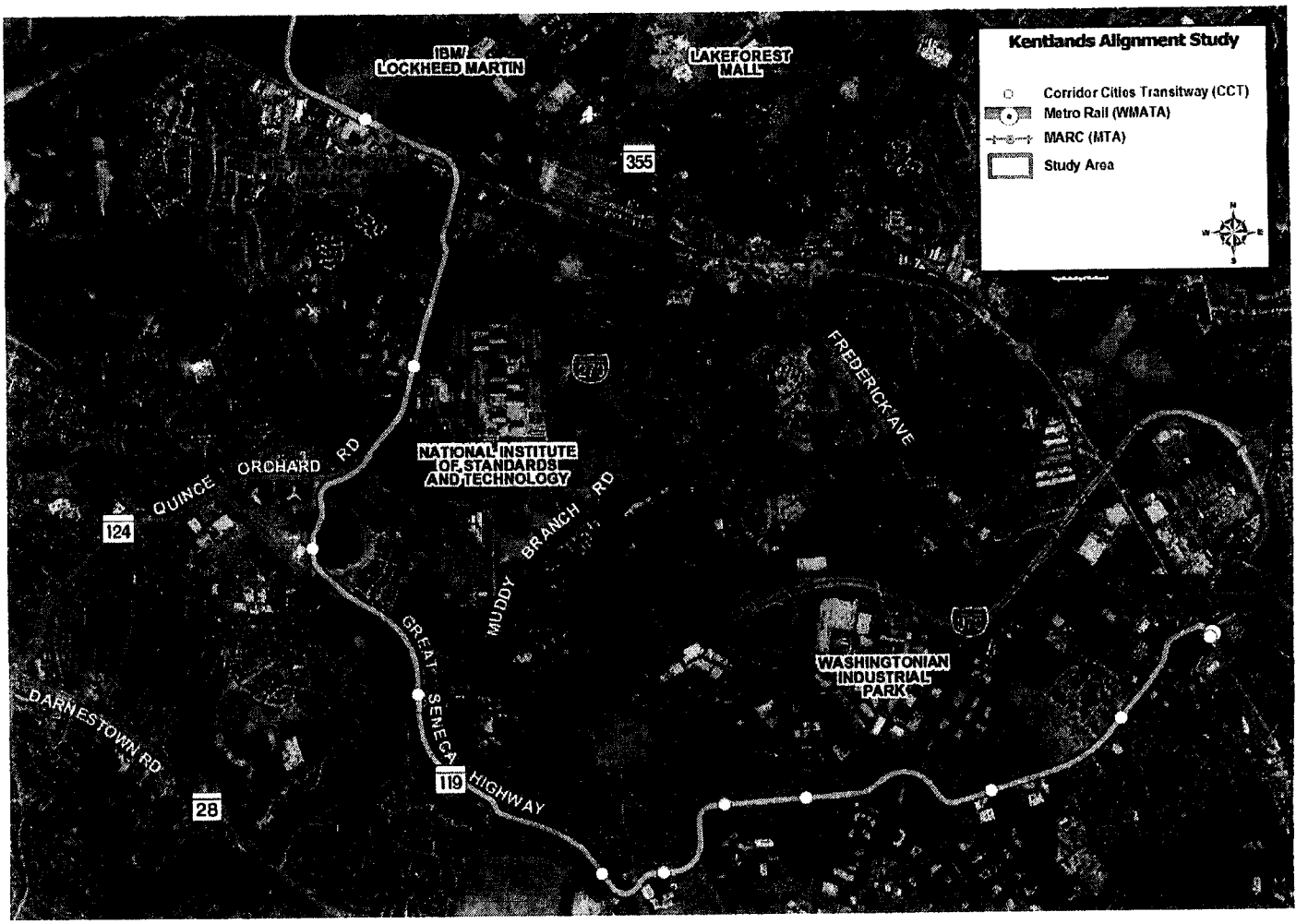
1.1 The Kentlands Alignment in Context of the Corridor Cities Transitway

The proposed CCT alignment consists of a 13.5 mile dedicated transit guideway beginning at the existing Shady Grove Metrorail station and extending generally to the northwest to the COMSAT complex south of Clarksburg. Future studies may consider additional extensions of the CCT to the north into Frederick County. Figure 1 shows the proposed CCT route as well as the Kentland study area. The CCT consists of 18 proposed stations, including transfer stations at the Shady Grove Metro and Metropolitan Grove MARC. Figure 2 shows the relationship of the study area to the CCT in the Gaithersburg area.



The proposed CCT alignment, referred to as the Master Plan alignment, is a reference to the Gaithersburg and Germantown Vicinity Master Plans, in which the CCT was originally proposed in the early 1970s. These master plans recommended the reservation of properties for CCT right-of-way, which Montgomery County has done in portions of the corridor. The development of the CCT alignment was guided by the County process, which was initiated before the Kentlands was developed.

Figure 2: Gaithersburg Vicinity



1.2 Initiation of the Kentlands Alignment Study and Objective

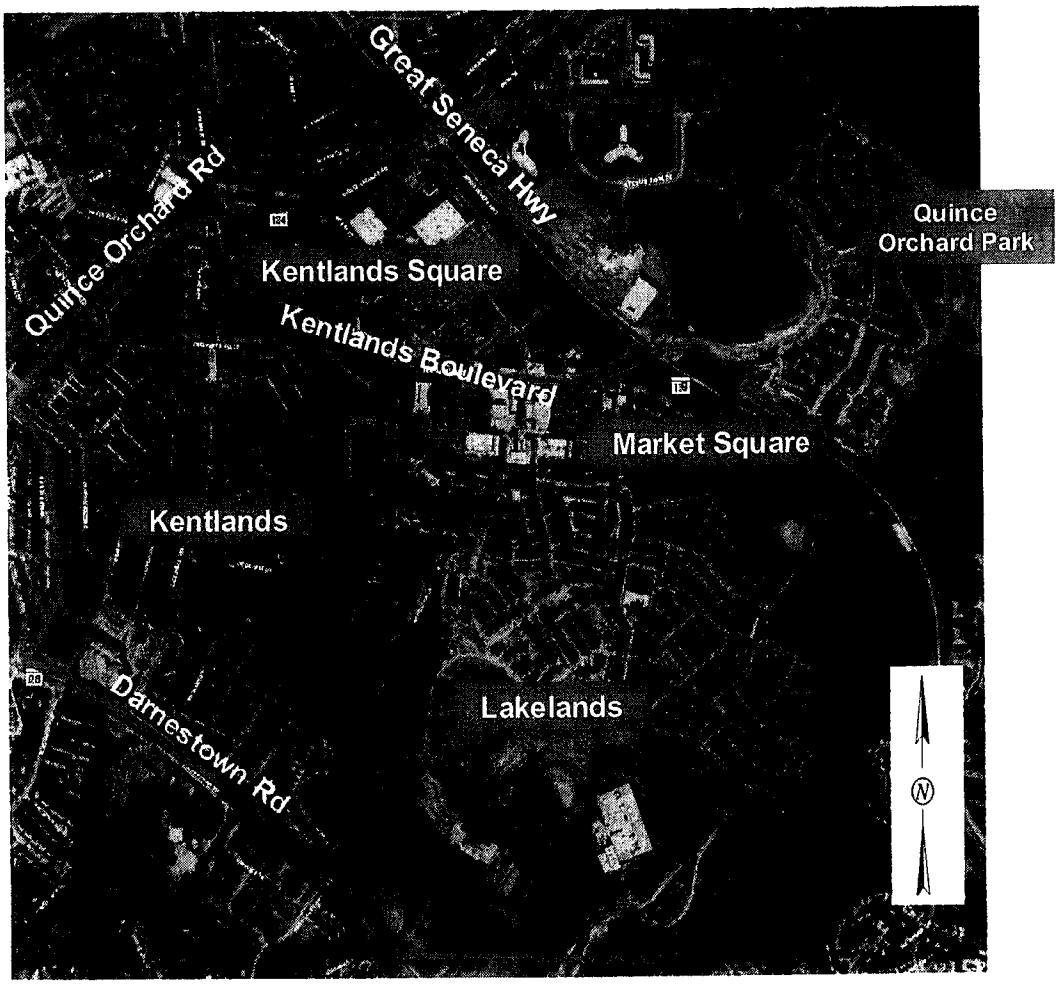
Throughout the I-270/US 15 Multi-Modal Corridor Study, there has been interest from members of the Kentlands in realigning the CCT to directly serve the community. This interest was expanded, when, in June 2003, the original team of designers of the Kentlands community returned for a three day design charrette in conjunction with the City of Gaithersburg's 15th anniversary celebration for the Kentlands. A primary objective of the charrette was to develop a vision for the next 15 years of the Kentlands. The charrette produced a conceptual plan that focused on redeveloping the Kentlands Square Shopping Center into a mixed-use town center. As part of this plan, the charrette team recommended routing the CCT to directly serve the Kentlands area, thereby assembling the components required to become a transit oriented development. Subsequently, MTA initiated this study in order to evaluate this alternative. This study presents the analysis on the feasibility of a CCT alignment that directly serves the Kentlands community.

2.0 Background

2.1 Study Area Profile

The study area, shown in Figure 3, encompasses a portion of the incorporated City of Gaithersburg that includes the Kentlands and Lakelands communities, as well as the areas to the north of Great Seneca Highway. This area features office development and the residential development of Quince Orchard Park.

Figure 3: Study Area

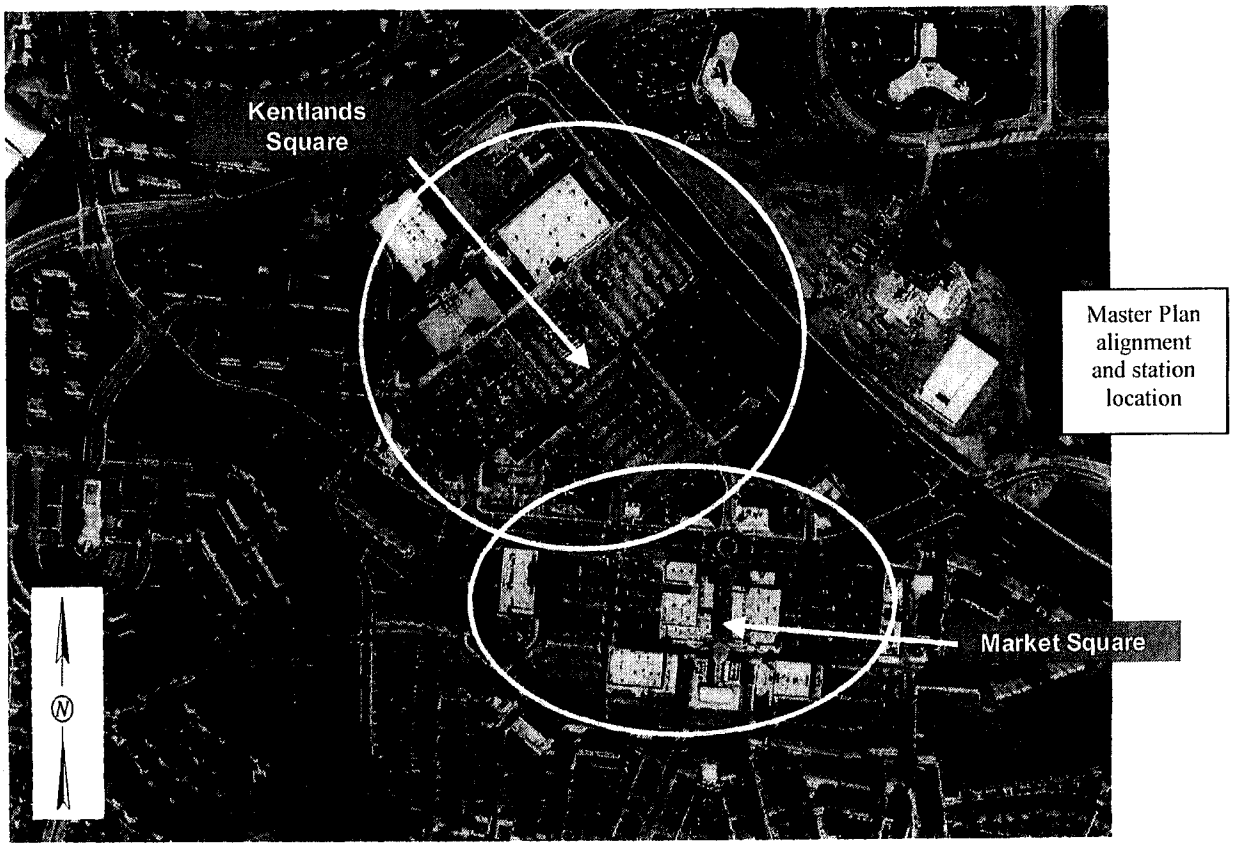


Both the Kentlands and Lakelands have been developed as traditional neighborhood developments (TNDs). TNDs are an alternative to the conventional suburban development pattern. Unlike conventional suburbs, which are characterized by separation of land uses and a primary dependence on

automobiles for mobility, TNDs allow mixing of land uses and are designed to be pedestrian and transit supportive.

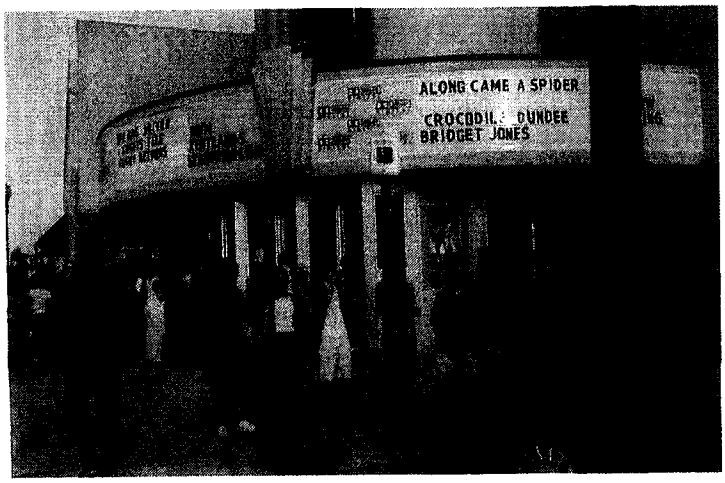
The Kentlands was one of the first TNDs developed in the U.S., beginning in 1987, and has been widely recognized as a national model of pedestrian-oriented planning and community design. Lakelands was developed beginning in the mid-1990's and has somewhat higher residential densities than Kentlands. Within the combined Kentlands/Lakelands area, there is a mix of uses and housing, retail, and offices. Figure 4 highlights the location of the pedestrian-oriented town center area called Market Square, which has become a community focal point, frequently drawing residents and visitors to its restaurants, movie theatre, retail shops, outdoor recreational activities, and special events. It also shows the location of Kentlands Square Shopping Center, which was a primary focus of the 2003 charrette. Figure 5 provides images of the Market Square area.

Figure 4: Town Center Aerial



The areas surrounding the Kentlands and Lakelands, including the portion of the study area north of Great Seneca Highway, have been developed in the conventional suburban pattern that consists of separated residential, office, and retail components that are not particularly conducive to pedestrian activity. The adjacent roadway network consists of arterial and collector roadways that have also been designed to conventional suburban standards.

Figure 5: Market Square Area



3.0 Transit Alternatives Considered

3.1 Alternative Alignments and Station Locations

Four Kentlands alignment options were identified as well as two transportation systems management (TSM) options. The alignment options consist of alternative CCT alignments which serve the Kentlands community directly, while the TSM options would retain the Master Plan alignment and station, but add enhancements to improve connections between the station area and the Kentlands/Lakelands communities. Figure 6 shows the location of the alignments studied and their relation to the Master Plan alignment. The following is a brief description of each option:

Alignment Option 1: This alignment runs along the west side of Great Seneca Highway to Kentlands Boulevard until turning onto Main street, where it crosses back over Great Seneca Highway on a proposed grade-separated structure, then traverses the northwestern edge of the MedImmune complex until joining Orchard Ridge Drive and linking back to the Master Plan alignment. A station would be placed either on Kentlands Boulevard, just east of Main Street, or in what is currently a parking lot of the Kentlands Square Shopping Center. This alignment option follows the recommended alignment in the 2003 Kentlands charrette.

Alignment Option 2: This alignment runs along the west side of Great Seneca Highway to Kentlands Boulevard to Quince Orchard Road, where it crosses Great Seneca Highway at-grade until it reconnects with the Master Plan alignment. A station would be located along Kentlands Boulevard, just east of Main Street.

Alignment Option 3: This alignment runs along the west side of Great Seneca Highway until it crosses the highway on a proposed grade-separated structure and turns east along the northwestern edge of the MedImmune complex. It then joins Orchard Ridge Drive and links back to the Master Plan alignment. A station would be located along Great Seneca Highway adjacent to the eastern edge of the Kentlands Square Shopping Center.

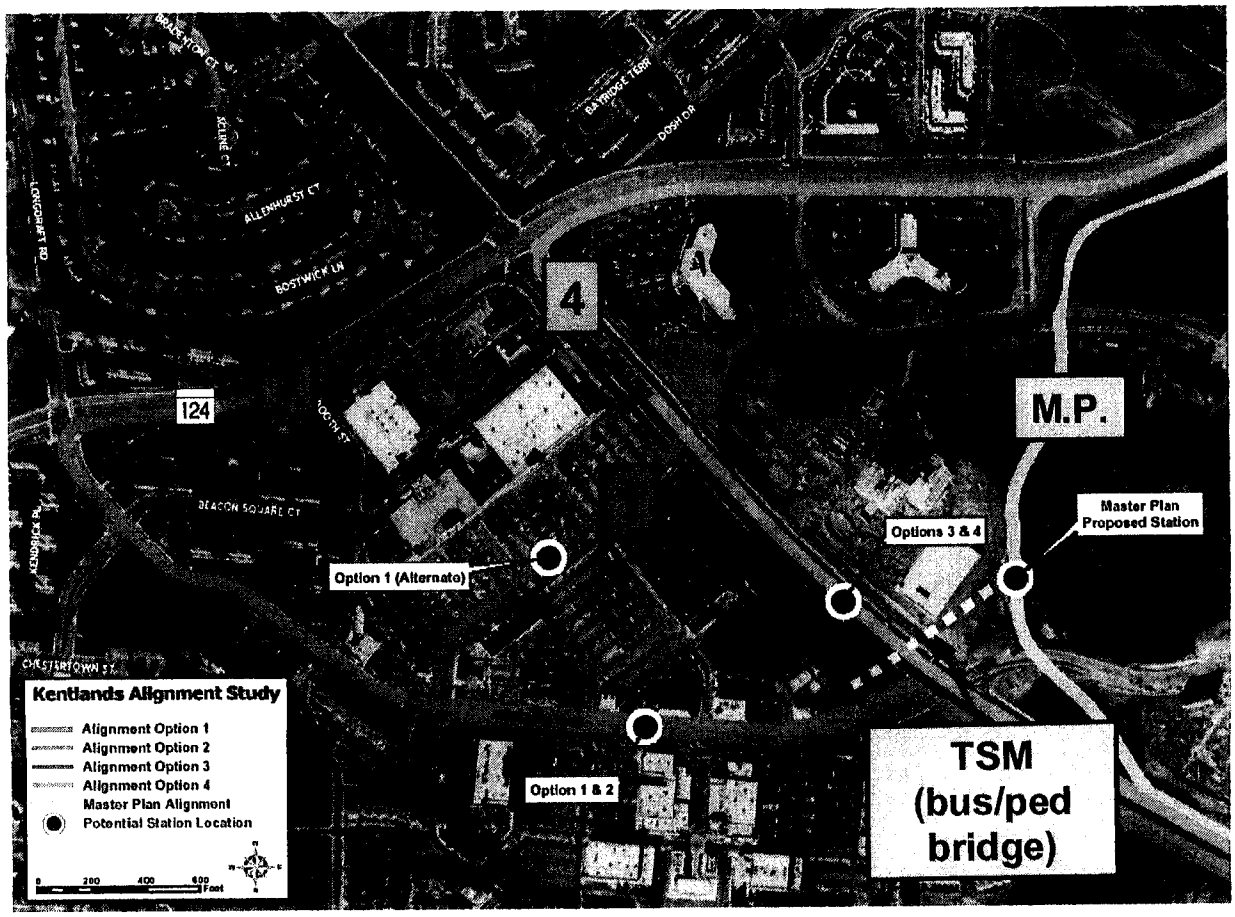
Alignment Option 4: This alignment runs along the west side of Great Seneca Highway until it turns east onto Quince Orchard Road at-grade. It then runs along Quince Orchard Road until it reconnects with the Master Plan alignment.

A station would be located along Great Seneca Highway adjacent to the eastern edge of the Kentlands Square Shopping Center.

The grade-separated structures for Alignment Options 1 and 3 would be both necessary and possible due to the elevation differences at the crossing locations. Grade separation of the alignments at these locations would minimize impacts on Great Seneca Highway traffic.

Transportation Systems Management (TSM) Option 1: This retains the Master Plan alignment, but includes a pedestrian path and bridge over Great Seneca Highway between the Quince Orchard Park/Sioux Lane station and the Kentlands Square Shopping Center. This path would provide a way for pedestrians to walk between the proposed Master Plan alignment station and the entrance to the Kentlands town center area without having to directly cross Great Seneca Highway.

Figure 6: Alternatives Considered

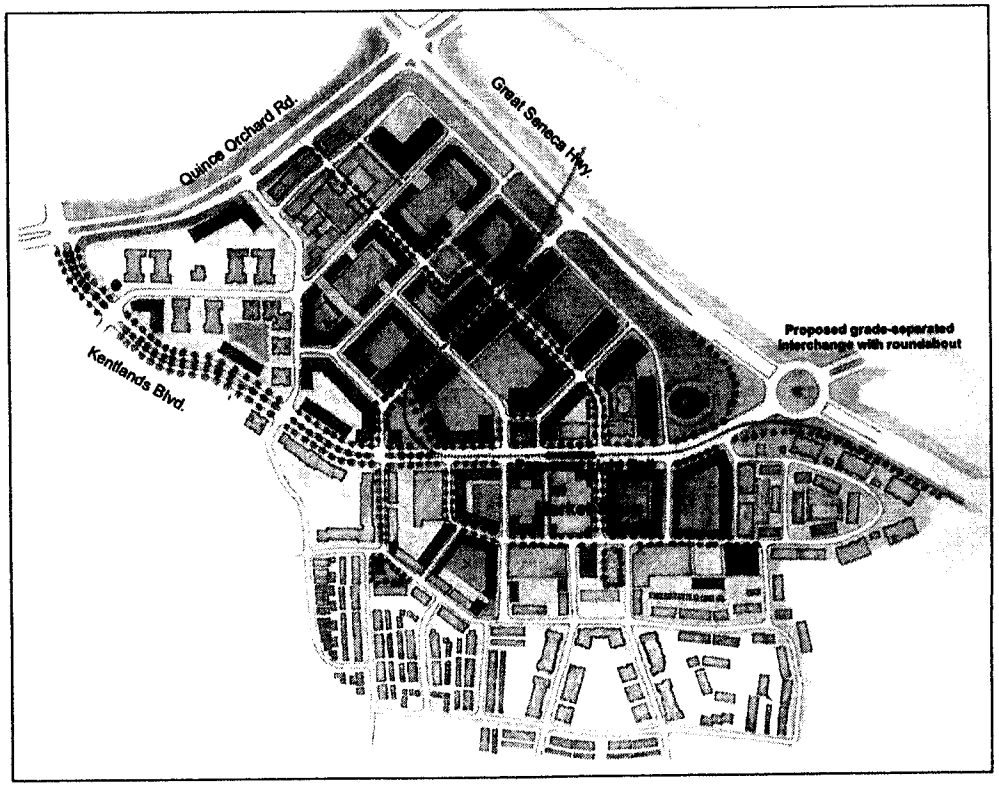


Transportation Systems Management (TSM) Option 2: This also retains the Master Plan alignment, but includes a pedestrian path and vehicle bridge over Great Seneca Highway. The vehicle lane would be used exclusively by shuttle buses circulating directly between the Quince Orchard Park/Sioux Lane station and the Kentlands and Lakelands communities.

3.2 Future Development Scenarios

For this study, two future scenarios, using a model year of 2025, were considered. The first scenario assumed that future development within the Kentlands commercial center (consisting of Kentlands Square Shopping Center and Market Square) would remain relatively unchanged from its present form. This is referred to as the "status-quo" future land use scenario. The second scenario assumes a redevelopment of the Kentlands Square Shopping Center that would occur as envisioned by the charrette plan shown in Figure 7. The latter consists of extensive infill development on existing surface parking lots and replacement of some of the existing commercial uses. This redevelopment would include a mix of new housing and commercial uses. Table 1 shows the assumptions used in the analysis.

Figure 7: Charrette Plan Redevelopment Scenario



While the type and amount of specific uses were not developed as part of the charrette plan, the assumptions presented in this study are consistent with the nature of redevelopment that was envisioned by the charrette team and represents a maximum build-out scenario.

Table 1: Charrette Plan Assumptions

TOD Build-Out Scenario Assumptions			
Land Use	**Size**	**AM Peak Hour Trips**	**PM Peak Hour Trips**
Office	1,000,000 SF	825	1,100
Multi-Family Residential	2,350 units	415	750
Hotel	125,000 SF	75	135
Retail	385,000 SF	630	4,100

The charrette plan also recommends a CCT alignment that is roughly comparable to the Kentlands Alignment Option 1. The charrette team recommended this alignment as a means to integrate transit and land use and increase potential transit oriented development (TOD) opportunities. For this reason, this future land use scenario will be referred to as the "TOD Build-Out" scenario. The trips generated by both future land use scenarios will be the basis for calculating traffic impacts and ridership projections in sections 4.2 and 4.3, respectively.

4.0 Evaluation of Alternatives

The approach for evaluating the alternatives was based on examining the standard costs and benefits of potential alignments. This included factors such as capital costs, ridership, travel time, environmental and community impacts, and traffic impacts. Additional factors which are more difficult to quantify or predict were also considered, including economic development potential, quality of life, and to what extent an alternative alignment would satisfy stated goals for integrating transit with land use.

4.1 Capital Costs

Each of the alternatives would incur additional capital costs above and beyond the Master Plan alignment. This is due to a combination of factors that include increased route length, additional infrastructure, additional right-of-way, and additional vehicles needed to accommodate the longer alignment. In the case of the TSM options, the only additional cost is the pedestrian/bus bridge to connect the Master Plan alignment to the Kentlands area. Table 2 presents the estimated costs associated with the various Kentlands alignments for both BRT and LRT options. These costs were generated assuming signal priority as opposed to signal preemption or no transit vehicle priority of any kind (these terms are described in section 4.2).

Table 2: Construction Costs

		Cost in millions					
	Master Plan Alignment	TSM 1	TSM 2	Option 1	Option 2	Option 3	Option 4
BRT	$ 13	$ 15	$ 17	$ 48	$ 50	$ 45	$ 43
Difference from Master Plan Alignment		$ 2	$ 4	$ 35	$ 37	$ 32	$ 30
LRT	$ 20	$ 22	$ 24	$ 68	$ 75	$ 52	$ 60
Difference from Master Plan Alignment		$ 2	$ 4	$ 48	$ 55	$ 32	$ 40

For the alternative alignment options, total construction costs would increase between approximately $32 million to $55 million above the Master Plan alignment, depending on which option and mode was selected. The TSM options would result in increases of approximately $2 million to $4 million.

4.2 Mobility and Circulation

In determining the feasibility of an alternative transit alignment, numerous factors were considered in how the Kentlands CCT alignments would affect the ease of mobility and access of various travel modes. These modes include automobile traffic, transit vehicle operations, and non-motorized (pedestrian/bicycle) accessibility and comfort.

Headways for LRT are assumed to be 10 minutes, while headways for BRT are one minute during peak periods and 3 minutes during off-peak. The following analysis is organized to show the effects of the alignments by mode, although all modes were considered together when analyzing the effects upon each.

Transit Operations

Three varying levels of transit "priority" are being considered for the CCT to proceed through signalized intersections. These include:

- *No transit priority:* transit vehicles wait their turn in the signal cycle.
- *Transit vehicle priority:* transit vehicles approach an intersection and wait through the current vehicular phase, but are given the next "green".
- *Transit vehicle pre-emption:* as a transit vehicle approaches an intersection, the signal phase immediately changes to give transit the "green" while all vehicular traffic is stopped.

Each of these priority options, combined with transit vehicle frequencies, will have an effect upon how transit vehicles and automobile traffic interact with each other at signalized intersections.

With respect to travel time for transit patrons, Table 3 shows the analysis for each of the three priority options as compared with the Master Plan alignment. The total travel time for the CCT from one end of the route to the other would increase for all Kentlands alignments by virtue of the additional distance traveled and, in some cases, the additional intersections it must cross. The additional distance required for the four Kentlands alignments would range from 4,000 to 15,000 feet, and add from 45 seconds to 7 minutes and 15 seconds to the total route travel time, depending on the option chosen and the kind of transit vehicle prioritization employed.

Table 3: Travel Times

		Additional travel time in minutes compared to master plan alignment					
	Master Plan alignment	TSM 1	TSM 2	Option 1	Option 2	Option 3	Option 4
No priority	5:00	0	0	5:00	7:15	1:00	3:45
With priority	5:50	0	0	4:15	5:45	1:00	3:00
With preemption	4:20	0	0	2:30	2:45	0:45	1:15

Vehicular Traffic

In order to assess the impact of various Kentlands CCT alignments, it is first necessary to begin with a baseline profile of current traffic circulation patterns without the Kentlands CCT alignment options, then forecast what impact on traffic the CCT alignments will have, and finally, what impact on traffic each of the CCT alignments plus the future TOD Build-Out scenario would have. The analysis considered traffic impacts by LRT and BRT under each of the three transit priority scenarios. The results of this analysis is described below:

Baseline - Within the study area today, traffic congestion on local roads and intersections is generally not problematic. Analysis of recent traffic counts and Critical Lane Volume analysis performed for this study show that intersections of local roads within Kentlands are operating well below capacity during peak periods. However, the intersection of Great Seneca Highway and Quince Orchard Road, two regional arterials that cross at the edge of the Kentlands study area, does experience significant delay during peak hours and is close to "failing" condition. Regional traffic models predict that traffic volumes and congestion at this intersection will continue to increase and fail during peak periods by the year 2030, given its current configuration. The CCT Master Plan alignment is considered to be far enough removed from the study area roadways and intersections that it is assumed not to have a significant impact on traffic operations in the study area. Thus, it is considered to be part of the baseline condition.

Impact on traffic with Kentlands CCT alignments - Critical Lane Volume analyses were performed by applying the Kentlands CCT alignments to near term baseline traffic conditions, using the three levels of transit priority previously discussed. The results of the analysis indicate that the introduction of the transitway had slight impacts on levels of service for either no signal priority or

signal priority conditions for most options. Signal preemption did cause several intersections to degrade and in some cases fail under several options. These results are shown in Table 4. Analysis of a 2030 year condition assuming CCT under the "status quo" land use build-out was then performed. Traffic volumes were increased to reflect 2030 regional volumes. Alignment Option 1 was selected to be analyzed, since it was considered to be the alignment that was the most feasible from a traffic operation standpoint. The only modification to the local roadway system in this analysis would be conversion of the two existing roundabouts along Kentlands Boulevard to conventional signalized intersections. This would be done to facilitate efficient transit operations and to create a more pedestrian-friendly environment in the town center area. The results of this analysis indicate that future traffic volumes will cause the major intersections to fail even before any transit related impacts are considered. The presence of the transitway under most options would exacerbate those conditions for options where they cross intersections at-grade. In the case of the two intersections along Kentlands Boulevard that would be converted from roundabouts to signalized intersections, the level of service would actually improve under certain scenarios.

Table 4: Near Term Traffic Levels of Service with Kentlands Alignment

Traffic Impacts - Near Term: LRT

		Level of Service													
		Existing		No-Build/Master Plan		TSM Option		Option 1		Option 2		Option 3		Option 4	
Critical Intersection	Transit Operation	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Great Seneca Hwy at Kentlands Blvd	No Priority	B	D	B	D	B	D	B	E	A	F	B	D	B	E
	Priority							C	E	C	E	C	E	B	D
	Preemption							D	E	C	E	E	F	E	F
Quince Orchard Road at Kentlands Boulevard	No Priority	B	C	B	C	B	C			C	C				
	Priority									C	C				
	Preemption									C	C				
Quince Orchard Road at Great Seneca Highway	No Priority	D	D	D	D	D	D			F	D			D	D
	Priority									E	E			D	F
	Preemption									E	F			D	F
Kentlands Blvd at Market Street	No Priority	A	A	A	A	A	A	A	A	A	A				
	Priority							A	A	A	A				
	Preemption							A	B	A	A				
Kentlands Blvd at Main Street	No Priority	A	A	A	A	A	A	A	A	B	B				
	Priority							A	B	A	B				
	Preemption							A	C	A	B				

Traffic Impacts - Near Term: BRT

		Level of Service													
		Existing		No-Build/Master Plan		TSM Option		Option 1		Option 2		Option 3		Option 4	
Critical Intersection	Transit Operation	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Great Seneca Hwy at Kentlands Blvd	No Priority	B	D	B	D	B	D	B	B	A	F	D	D	B	E
	Priority							C	E	C	F	E	E	C	E
	Preemption							D	F	F	F	F	F	D	F
Quince Orchard Road at Kentlands Boulevard	No Priority	B	C	B	C	B	C			C	C				
	Priority									C	C				
	Preemption									C	C				
Quince Orchard Road at Great Seneca Highway	No Priority	D	D	D	D	D	D			B	D			D	E
	Priority									B	F			D	F
	Preemption									F	F			F	F
Kentlands Blvd at Market Street	No Priority	A	A	A	A	A	A	A	A	A	A				
	Priority							A	A	A	A				
	Preemption							A	B	A	B				
Kentlands Blvd at Main Street	No Priority	A	A	A	A	A	A	B	B	B	B				
	Priority							A	C	A	B				
	Preemption							A	B	A	B				

Table 5: 2030 Traffic Levels of Service with Kentlands Alignment – Status Quo Future Land Use

Traffic Impacts - Status Quo Future Land Use: LRT

Critical Intersection	Transit Operation	Level of Service													
		Existing		No-Build/Master Plan		TSM Option		Option 1		Option 2		Option 3		Option 4	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Great Seneca Hwy at Kentlands Blvd	No Priority	B	D	F	F	F	F	F	F						
	Priority							F	F						
	Preemption							F	F						
Quince Orchard Road at Kentlands Boulevard	No Priority	B	C	C	F	C	F								
	Priority														
	Preemption														
Quince Orchard Road at Great Seneca Highway	No Priority	D	D	F	F	F	F								
	Priority														
	Preemption														
Kentlands Blvd at Market Street	No Priority	A	A	A	D	A	D	A	A						
	Priority							A	A						
	Preemption							A	B						
Kentlands Blvd at Main Street	No Priority	A	A	A	C	A	C	A	A						
	Priority							A	B						
	Preemption							A	B						

Traffic Impacts - Status Quo Future Land Use: BRT

Critical Intersection	Transit Operation	Level of Service													
		Existing		No-Build/Master Plan		TSM Option		Option 1		Option 2		Option 3		Option 4	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Great Seneca Hwy at Kentlands Blvd	No Priority	B	D	F	F	F	F	F	F						
	Priority							F	F						
	Preemption							F	F						
Quince Orchard Road at Kentlands Boulevard	No Priority	B	C	C	F	C	F								
	Priority														
	Preemption														
Quince Orchard Road at Great Seneca Highway	No Priority	D	D	F	F	F	F								
	Priority														
	Preemption														
Kentlands Blvd at Market Street	No Priority	A	A	A	D	A	D	A	A						
	Priority							A	A						
	Preemption							A	B						
Kentlands Blvd at Main Street	No Priority	A	A	A	C	A	C	B	B						
	Priority							A	B						
	Preemption							B	C						

Impact on traffic with Kentlands CCT alignments plus the trips generated by the TOD-Build-Out scenario – Finally, in order to account for additional automobile trips that would be generated by the additional development proposed in the TOD-Build Out scenario, the development assumptions that were presented in Section 3.2 were applied to the Critical Lane Volume analysis. Montgomery County allows for a 10% reduction in the trip generation rate for automobile trips when development is within 1,000 feet of a transit station, and this was used in preparation of this analysis.

Table 6: 2030 Traffic Levels of Service with Kentlands Alignment – TOD Build-Out

Traffic Impacts - TOD Build-Out: LRT

		Level of Service													
		Existing		No-Build/Master Plan		TSM Option		Option 1		Option 2		Option 3		Option 4	
Critical Intersection	Transit Operation	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Great Seneca Hwy at Kentlands Blvd	No Priority	B	D	F	F	F	F	F	F						
	Priority							F	F						
	Preemption							F	F						
Quince Orchard Road at Kentlands Boulevard	No Priority	B	C	C	F	C	F	E	F						
	Priority							F	F						
	Preemption							E	F						
Quince Orchard Road at Great Seneca Highway	No Priority	D	D	F	F	F	F	F	F						
	Priority							F	F						
	Preemption							F	F						
Kentlands Blvd at Market Street	No Priority	A	A	A	D	A	D	A	E						
	Priority							A	F						
	Preemption							A	F						
Kentlands Blvd at Main Street	No Priority	A	A	A	C	A	C	A	F						
	Priority							A	F						
	Preemption							C	F						

Traffic Impacts - TOD Build-Out: BRT

		Level of Service													
		Existing		No-Build/Master Plan		TSM Option		Option 1		Option 2		Option 3		Option 4	
Critical Intersection	Transit Operation	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Great Seneca Hwy at Kentlands Blvd	No Priority	B	D	F	F	F	F	F	F						
	Priority							F	F						
	Preemption							F	F						
Quince Orchard Road at Kentlands Boulevard	No Priority	B	C	C	F	C	F	F	F						
	Priority							F	F						
	Preemption							D	F						
Quince Orchard Road at Great Seneca Highway	No Priority	D	D	F	F	F	F	F	F						
	Priority							F	F						
	Preemption							F	F						
Kentlands Blvd at Market Street	No Priority	A	A	A	D	A	D	A	D						
	Priority							A	F						
	Preemption							B	F						
Kentlands Blvd at Main Street	No Priority	A	A	A	C	A	C	A	F						
	Priority							A	F						
	Preemption							F	F						

Despite this reduction allowance however, the outcome showed that significant delay was added in the PM peak periods. Intersections that were already failing, were made worse by the transitway, and most intersections that were not failing would then fail. This was due to the large volume of trips associated with the TOD Build-Out scenario. This would suggest that this aggressive redevelopment scenario would generate too many trips for the roadway to handle. Judging from the differences in level of service between the status-quo and TOD scenarios, this would also suggest that a redevelopment effort could be feasible if it were scaled back to a point where acceptable roadways levels of service were accommodated. This is an issue largely independent of the transitway alignment.

Non-motorized Accessibility and Comfort

The option selected will affect the degree of non-vehicle access to the CCT. The character of the built environment is significantly different between the proposed Master Plan alignment station and that of the proposed Kentlands alignment station. The Master Plan alignment station is in a low-lying area near the MedImmune parking garage and set back from Great Seneca Highway. The

development pattern in this area lacks spatial definition and, consequently, little pedestrian activity occurs. Passengers waiting at the CCT station may feel isolated due to its poor visibility. In addition, those walking or biking to this station may encounter a discouraging walking environment, particularly after dark. For those accessing the station from the south side of Great Seneca Highway, the highway itself represents a physical and psychological barrier. Few pedestrians attempt to cross this major arterial roadway because of its width, high speeds, and traffic volumes. The construction of a pedestrian bridge over the highway may improve physical safety of the crossing, but the lengthy, isolated walk that would still be required could deter residents from walking. A wider, well-lit bridge with pedestrian friendly amenities could minimize these negative impacts. A dedicated shuttle bus service operating on the bridge has the potential to improve accessibility for pedestrians. This bridge could also serve pedestrian traffic from MedImmune and Quince Orchard Park wishing to access Market Square and Kentlands Square Shopping Center.

By contrast, the Kentlands area experiences high pedestrian activity, particularly in the town center area. The development pattern here was expressly designed to be more pedestrian friendly than in conventional suburban developments. Buildings are oriented to the street, and blocks are small and part of an interconnected street network. While the Kentlands Square Shopping Center was built as a conventional strip center, its parking lots were designed as a "grid" that could eventually be infilled with development. The Kentlands charrette team used this principle in developing the plan for redeveloping Kentlands Square into a pedestrian and transit-oriented town center. The proposed station location for Alignment Options 1 and 2 along Kentlands Boulevard at the entrance to Market Square represent the ideal location for a pedestrian-friendly station environment. The street is fronted by buildings that look out on to it, and the area has high pedestrian activity. This station location is also centrally located between Market Square and Kentlands Square, and is the closest to the population base of the pedestrian-oriented communities of Kentlands and Lakelands.

The station location referred to as Option 1 (Alternate), which is located in what is currently the middle of the Kentlands Square parking lot, would become appropriate if the TOD Build-Out scenario is realized. The surface lots would be replaced with "urban" buildings that front the street with little or no setbacks, and some of the existing parking lot's aisles would become proper streets. This location is not as desirable as the Kentlands Boulevard site, but is still more

accessible, visible, and pedestrian-oriented than the Master Plan alignment station next to MedImmune.

The station location for Options 3 and 4 represents a less than ideal location from a pedestrian accessibility and comfort standpoint because of its proximity to Great Seneca Highway, but passengers would at least be visible from the highway and feel less isolated than at the Quince Orchard Park/Sioux Lane station site. This location does have the potential for creating synergy with the town center if well-designed infill development that establishes a seamless pedestrian environment between the town center and the station were to occur.

4.3 Ridership

Ridership estimates were prepared for the Kentlands alignment options. The TSM options were not considered to have a significant net affect on ridership. In order to estimate ridership, a methodology was applied based on a combination of best available data and assumptions. These assumptions included:

- *Defining the walk catchment area for each station location*: This was done by taking into account walk distance, quality of pedestrian environment, development patterns, street network connectivity, and physical barriers.
- *The number of residents and jobs within each walk catchment area:* To calculate residents, existing and future population estimates from the City of Gaithersburg for specific neighborhoods in the study area were obtained. For jobs, counts of employees at businesses in the study area were also obtained and then a growth factor based on the Metropolitan Washington Council of Government employment forecasts for this area was applied.
- *The percentage of residents and workers within the study area that would walk to transit (transit mode share):* A percentage of residents and workers that would walk to the CCT was then applied to the future population and job figures. Within each catchment area, these percentages varied by distance and ranged between 3 percent to 8 percent for residents and 1.5 percent to 6 percent for employees. The percentage decreased in ¼ mile radius rings, emanating outward from each proposed station location.
- *The number of total trips generated by TOD-Build Out land use scenario:* Based on the generated trips presented in Table 1 and the proximity to the station, transit shares in the range of 6 percent to 10 percent were applied. For purposes of this analysis, it was assumed that the TOD redevelopment would not occur under the Master Plan alignment or TSM options due to the proximity of the transit station. Therefore this did not affect ridership

numbers for those scenarios. However, reality is far more complex, and it is beyond the scope of this study to determine the potential for the redevelopment to occur or the degree to which transit ridership would be affected under the Master Plan alignment.

- *The decrease in ridership at stations north of the Kentlands area as a result of increased travel time through the Kentlands:* This was based on a standard elasticity formula. The longer the alignment option, the greater the decrease in ridership for those stations north of the Kentlands.

The results of the analysis, shown in Table 7, shows a net increase in ridership on the CCT for three of the four Kentlands alignment options, ranging from a net gain of from 203 to 783 trips. Option 2, which is the longest of the alignments, would result in a net loss of 66 trips. When the TOD Build-Out scenario is included, an additional 1,628 riders are added to each of the Kentlands alignment options.

Table 7: Ridership

	Master Plan Alignment Station	TSM 1	TSM 2	Alignment 1	Alignment 2	Alignment 3	Alignment 4
Daily Trips - Status Quo Future Land Use Scenario	1,925	1,925	1,925	2,128	1,859	2,708	2,340
Change in Net Ridership versus Master Plan Alignment		-	-	203	-66	783	415
Daily Trips - TOD Build-Out Scenario	1,925	1,925	1,925	3,756	3,487	4,336	3,968
Change in Net Ridership versus Master Plan Alignment		-	-	1,831	1,562	2,411	2,043

4.4 Quality of Life Considerations

Quality of life, while difficult to quantify, can be measured in the context of transportation and urban planning, by indicators such as relative walkability and mobility choice provided to residents and workers. The Kentlands Alignment options clearly build upon the "livability" factors, which the Kentlands and Lakelands communities were designed to embody. Conversely, locating the alignment and station in the current Master Plan location would not create the walkability or mobility choices that the Kentlands alignment options provide. While the CCT itself can be considered an increased mobility choice to residents

of the region at large, the mode of access by users to the CCT should also be taken into account. If the station is designed and situated to be accessed primarily by car, then mobility choices for accessing the station are not being provided to the degree that they could be if the station is in a pedestrian-oriented location.

4.5 Environmental and Community Impacts

Impacts to the natural environment as well as to existing residents were considered. For each alignment option, the natural environment was examined. It was determined that, due to the nature of the area being almost entirely urbanized, few impacts would result. In fact, since the Master Plan alignment traverses a low-lying area that includes some non-tidal wetlands, Kentlands alignment Options 1 and 2 would have fewer impacts since they avoid that low-lying area. In the case of Options 3 and 4, a depressed wooded area along Great Seneca would be impacted, but it did not appear to contain any non-tidal wetlands. More detailed study would be necessary to confirm this.

In performing an assessment of cultural and community impacts, no historic resources or community facilities were seen as being negatively impacted. All four Kentlands alignment options travel past an apartment complex at Great Seneca Highway and Kentlands Boulevard, and Option 2 travels past a residential area at the western portion of the study area. Potential noise and vibration impacts would be of potential concern, particularly under a BRT scenario, where headways would be in the vicinity of one vehicle per minute.

4.6 Comparison of Alternatives

Table 8 presents a summary of the Kentlands alignment and TSM options compared with the Master Plan alignment:

Table 8: Comparison of Alternatives

Consideration	Master Plan Alignment	TSM Option 1	TSM Option 2	Alignment Option 1	Alignment Option 2	Alignment Option 3	Alignment Option 4
Construction Cost	Baseline	+$2M	+$4M	+$35 to $48M	+$37 to $55M	+$32M	+$30 to $40M
Travel Time	Baseline	No change	No change	+2.5 to 5 minutes	+ 2.75 to 7.25 minutes	+ .75 to 1 minute	+ 1.2 to 3.7 minutes
Traffic Impacts	Very low	Very low	Very low	High	Very high	Moderate	Very high
Ridership (Status Quo Land Use Scenario)	Baseline	No change	No change	+203	-66	+783	+415
Natural Environment Impacts	Moderate	Moderate	Moderate	Low	Low	Low/ Moderate	Low/ Moderate
Community Impacts	Very low	Very low	Very low	Low	Low	Low	Low

5.0 Conclusion

Upon analyzing the potential for a CCT alignment to serve the Kentlands area, it became apparent that there would be both significant advantages and disadvantages. The analysis found that a Kentlands alignment would provide better integration with land use and provides greater potential for generating walk trips to transit than the Master Plan alignment. A Kentlands alignment could also generate gains in local ridership due to a station location that is within an active pedestrian area. The increase in ridership would be further increased if the aggressive redevelopment scenario that was envisioned in the charrette plan were applied.

However, the analysis also showed that introduction of a transitway through the Kentlands area could result in significant impacts to the local roadway system, which is already expected to degrade over time irrespective of the CCT. Noise and vibration impacts to residential areas could also be of concern under a BRT operating scenario due to frequent headways. The analysis also found that there would be higher capital costs associated with a Kentlands alignment due to the increased length required to serve the target area and a decrease in ridership north of this area due to the increase in travel time. These factors would adversely affect the cost effectiveness of the CCT project overall, and would negatively impact the chances of the project receiving FTA approval in a very competitive field of New Start proposals. The longer alignment length would also increase travel time to passengers requiring travel through the Kentlands area on the CCT versus the Master Plan alignment.

The TSM options, which provide a pedestrian bridge and a shuttle bus bridge associated with the Master Plan alignment and station, would improve safety for those pedestrians wishing to make the walk from the Kentlands and Lakelands area to the station. While it would not create the kind of integration between transit and surrounding land use that would be achieved by locating the station directly in the Kentlands, it could nevertheless provide an improved viable alternative solution.

Based on the findings presented in this report, a realignment of the CCT through the Kentlands is not recommended. However, as efforts continue to plan and design the CCT, further study of the TSM options to include better pedestrian connections to communities south of Great Seneca Highway is recommended.